REMARKS

Applicant has submitted replacement claims (above) and a marked-up copy of the old claims (attached as Appendix "A") as required by the new PTO rules. If the Examiner has any questions regarding the amendments, he is invited to contact the undersigned at (949)567-2305.

Respectfully submitted,

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APPENDIX "A"

**MARKED-UP VERSION OF PENDING CLAIMS
IN APPLICATION OF JOHN R. HAVENS, ET AL.
FOR: PERMEATION LAYER ATTACHMENT CHEMISTRY AND METHOD
(Application Number to be assigned)**

1. [AMENDED] An electronically addressable microchip device comprising a plurality of electronically programmable microlocations:

[a. at least one electrode;]

[b. a permeation layer; and]

[c linker moieties connecting said at least one electrode to said permeation layer, wherein said linker moieties are connected to said electrode and permeation layer by covalent bonds, said covalent bonds capable of withstanding a current density of at least 0.04 $nA/\mu m^2$.]

wherein the microlocations each comprise an underlying working microelectrode on a substrate,

wherein at least some of the microelectrodes are covered by a permeation layer,

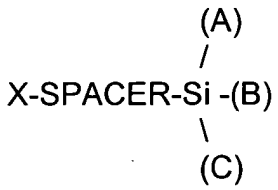
further wherein at at least one microlocation the permeation layer is covalently attached to the electrode by linker moieties,

and wherein the covalent attachment between the electrode and the linker and the permeation layer material is stable at a current density of at least 0.04 $nA/\mu m^2$.

2. [AMENDED]. [An] The electronically addressable microchip [according to] of claim 1 wherein [said] the permeation layer [is] comprises a material selected from the group consisting of [a polymer, a hydrogel, a porous inorganic oxides created through a sol-gel process, agarose, glyoxylagarose, and polymers synthesized from any acrylamide, methacrylamide, or a synthetic monomer] an inorganic sol-gel, a synthetic polymer hydrogel, and a carbohydrate hydrogel.

3. [AMENDED] [An] The electronically addressable microchip [according to] of claim 1 wherein [said] the electrode is selected from the group consisting of platinum silicide (PtSi), tungsten silicide [(Wti)] (WSi), titanium silicide (TiSi), gold silicide (AuSi), platinum/titanium (Pt/Ti), gold/titanium (AuTi), poly(phenylene vinylene), polythiophene, and polyaniline.

4. [AMENDED] [An] The electronically addressable microchip [according to] of claim 1 wherein the linker has the formula



wherein:

X is selected from the group consisting of acrylate, methacrylate, acrylamide, methacrylamide, allyl, vinyl, acetyl, amine, substituted amine, epoxy and thiol;

SPACER is selected from the group consisting of alkyl, aryl, mono- or polyalkoxy, ethyleneglycol, polyethyleneglycol, mono- or polyalkylamine, mono- or polyamide, thioether derivatives, and mono- or polydisulfides;

A and B are selected from the group consisting of Oxygen-R, Cl, Br, and an X-SPACER moiety, or any combination thereof, wherein R is H, alkyl, methyl, ethyl, propyl, isopropyl, and branched or linear alkyl of 4 to 10 carbon atoms; and

C is a hydrolyzable moiety selected from the group consisting of Oxygen-R, Cl, and Br, wherein R is H, branched alkyl, methyl, ethyl, propyl, isopropyl, and branched or linear alkyl of 4 to 10 carbon atoms.

5. [AMENDED] [An] The electronically addressable microchip [according to] of claim 4 wherein the linker is selected from the group consisting of [APS, AEAPS, AHAPS, MOTS, and AMPTS]:

$H_2NCH_2CH_2CH_2Si(OCH_3)_3$,

$H_2NCH_2CH_2NHCH_2CH_2CH_2Si(OCH_3)_3$,

$H_2NCH_2CH_2CH_2CH_2CH_2CH_2NHCH_2CH_2CH_2Si(OCH_3)_3$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(OCH_3)_3$, and

$CH_2=CHCONHCH_2CH_2CH_2Si(OC_2H_5)_3$.

Claims 6-14 are cancelled.

15. [NEW] The electronically addressable microchip of claim 1 wherein the permeation layer is a hydrogel comprising a material selected from the group consisting of: agarose, glyoxylagarose, acrylamide, methacrylamide, polyacrylamide, and other synthetic polymers

16. [NEW] The electronically addressable microchip of claim 15 wherein the hydrogel comprises glyoxylagarose.

17. [NEW] The electronically addressable microchip of claim 15 wherein the hydrogel comprises polyacrylamide.

18. [NEW] The electronically addressable microchip of claim 1 wherein the electrode is a metal/silicide electrode selected from the group consisting of platinum silicide (PtSi), tungsten silicide (WSi), titanium silicide (TiSi), and gold silicide (AuSi).

19. [NEW] The electronically addressable microchip of claim 1 wherein the electrode is a metal/metal electrode selected from the group consisting of platinum/titanium (PtTi) and gold /titanium (AuTi).

20. [NEW] The electronically addressable microchip of claim 1 wherein the electrode is an organic electrode selected from the group consisting of poly(phenylene vinylene), polythiophene, and polyaniline.

21. [NEW] The electronically addressable microchip of claim 4 wherein the linker is an acrylate linker selected from the group consisting of:

$CH_2=CHCOOCH_2CH_2CH_2Si(OCH_3)_3$,

$CH_2=CHCOOCH_2CH_2CH_2SiCl_3$,

$CH_2=CHCOOCH_2CH_2CH_2Si(CH_3)(OCH_3)_2$,

$CH_2=CHCOOCH_2CH_2CH_2Si(CH_3)_2(OCH_3)$,

$CH_2=CHCOOCH_2CH_2CH_2Si(CH_3)Cl_2$, and

$CH_2=CHCOOCH_2CH(OH)CH_2NHCH_2CH_2CH_2Si(OC_2H_5)_3$.

22. [NEW] The electronically addressable microchip of claim 4 wherein the linker is a methacrylate linker selected from the group consisting of:

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(OCH_3)_3$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2SiCl_3$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(CH_3)(OCH_3)_2$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(CH_3)_2(OCH_3)$,

$CH_2=C(CH_3)COOCH_2CH_2CH_2Si(CH_3)Cl_2$, and

$CH_2=C(CH_3)COOCH_2CH(OH)CH_2NHCH_2CH_2CH_2Si(OC_2H_5)_3$.

23. [NEW] The electronically addressable microchip of claim 4 wherein the linker is an acrylamide linker selected from the group consisting of:

$CH_2=CHCONHCH_2CH_2CH_2Si(OC_2H_5)_3$,

$CH_2=CHCONHCH_2CH_2CH_2SiCl_3$,

$CH_2=CHCONHCH_2CH_2CH_2Si(CH_3)(OCH_3)_2$,

$CH_2=CHCONHCH_2CH_2CH_2Si(CH_3)_2(OCH_3)$,

$CH_2=CHCONHCH_2CH_2CH_2Si(CH_3)Cl_2$,

$CH_2=CHCONHCH_2CH(OH)CH_2NHCH_2CH_2CH_2Si(OC_2H_5)_3$, and

CH_2=CHCONHCH$_2$CH$_2$CONHCH$_2$CH$_2$CONHCH$_2$CH$_2$CH$_2$Si(OC_2H_5)$_3$.

24. [NEW] The electronically addressable microchip of claim 4 wherein the linker is a methacrylamide linker selected from the group consisting of:

CH_2=C(CH_3)CONHCH$_2$CH$_2$CH$_2$Si(OCH_3)$_3$,

CH_2=C(CH_3)CONHCH$_2$CH$_2$CH$_2$SiCl_3,

CH_2=C(CH_3)CONHCH$_2$CH$_2$CH$_2$Si(CH_3)(OCH_3)$_2$,

CH_2=C(CH_3)CONHCH$_2$CH$_2$CH$_2$Si(CH_3)$_2$(OCH_3),

CH_2=C(CH_3)CONHCH$_2$CH$_2$CH$_2$Si(CH_3)Cl_2, and

CH_2=C(CH_3)CONHCH$_2$CH(OH)CH$_2$NHCH$_2$CH$_2$CH$_2$Si(OC_2H_5)$_3$.

25. [NEW] The electronically addressable microchip of claim 4 wherein the linker is an allyl derivative linker selected from the group consisting of:

CH_2=CHCH$_2$NHCH$_2$CH$_2$CH$_2$Si(OCH_3)$_3$,

CH_2=CHCH$_2$SiH(OCH_3)$_2$,

CH_2=CHCH$_2$Si(CH_3)$_2$Cl,

CH_2=CHCH$_2$SiHCl_2, and

CH_2=CHCH$_2$Si(OCH_3)$_3$.

26. [NEW] The electronically addressable microchip of claim 4 wherein the linker is an amino derivative linker selected from the group consisting of:

H_2NCH$_2$CH$_2$NHCH$_2$CH$_2$CH$_2$Si(OCH_3)$_3$,

H_2NCH$_2$CH$_2$CH$_2$CH$_2$CH$_2$CH$_2$NHCH$_2$CH$_2$CH$_2$Si(OCH_3)$_3$,

H_2NCH$_2$CH$_2$CH$_2$Si(OCH_3)$_3$, and

H_2NCH$_2$CH$_2$CH$_2$Si(OC_2H_5)$_3$.

27. [NEW] The electronically addressable microchip of claim 4 wherein the linker is an epoxy derivative linker selected from the group consisting of:

and

28. [NEW] The electronically addressable microchip of claim 5 wherein the linker is $H_2NCH_2CH_2CH_2Si(OCH_3)_3$.

29. [NEW] The electronically addressable microchip of claim 5 wherein the linker is $H_2NCH_2CH_2NHCH_2CH_2CH_2Si(OCH_3)_3$.

30. [NEW] The electronically addressable microchip of claim 5 wherein the linker is $CH_2=C(CH_3)COOCH_2CH_2CH_2Si(OCH_3)_3$.

31. [NEW] The electronically addressable microchip of claim 1 wherein the resulting covalent attachment between the electrode and the linker and the permeation layer material is stable at a current density of at least 0.1 $nA/\mu m^2$.

32. [NEW] The electronically addressable microchip of claim 1wherein the resulting covalent attachment between the electrode and the linker and the permeation layer material is stable at a current density of at least 0.2 $nA/\mu m^2$.

33. [NEW] The electronically addressable microchip of claim 1wherein the resulting covalent attachment between the electrode and the linker and the permeation layer material is stable at a current density of at least 0.4 $nA/\mu m^2$.